Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
AT&T Mobility Spectrum LLC; BellSouth	)	
Mobile Data, Inc.; New Cingular Wireless PCS,	)	WT Docket No. 16-181
LLC; and SBC Telecom, Inc.	)	
	)	File Nos. 0007239621, et al.
Petition for Limited Waiver of Interim	)	
Performance Requirement for 2.3 GHz WCS C	)	
and D Block Licenses	)	

COMMENTS OF NOKIA

Nokia submits these Comments in support of the above-captioned Petition for Limited Waiver sought by AT&T (the "Petition"), as amended by subsequently filed Supplement to the Petition for Limited Waiver (the "Supplement"). In these Comments, Nokia demonstrates complete agreement with the facts as provided in the AT&T Petition and Supplement and provides additional information to further show that Commission grant of the requested relief would serve the public interest.

I. NOKIA IS A LEADER IN LTE SOLUTIONS FOR UTILITY CUSTOMERS

Nokia is an innovation powerhouse and represents unparalleled leadership in the technologies that connect people and things. Nokia is creating a new type of network that is intelligent, efficient, and secure, and to advance the technologies that tap its power through smart devices and sensors. We are weaving together the networks, data, and device technologies to create the universal fabric of our connected lives. In this new paradigm, new applications will flow without constraint, services and industry will automate and run seamlessly, communities and businesses can rely on privacy, security, and near instant response times by connecting through the cloud.

Nokia's combination with Alcatel-Lucent earlier this year brings together two high-performing companies to create a single portfolio, converging mobile broadband with fixed line access, and the underlying IP routing and optical technology that connects them. The combination also provides Nokia with highly complementary skills and geographic presences across the globe.

Nokia's expertise extends to a substantial presence in the utilities space. Nokia has worked with many U.S. utilities to modernize their transmission grid communications that support the flow of energy between large generation sites and distribution grids to enable greater remote monitoring, control and automation. In fact, the Nokia LTE solution has 318 commercial references spanning a variety of industries such as telecommunications, transportation, and energy.

Today, these networks are enabling utilities to enhance the grid's safety, reliability and operational efficiency that directly benefit their customers. With the introduction of the AT&T-Nokia smart grid solution described by AT&T in its Petition, Nokia is now enhancing the capabilities of our globally deployed end-to-end LTE solution to support for the C and D blocks for pilots/trials with utilities beginning in the fourth quarter of 2016. The product enhancements paired with AT&T's spectrum will provide the utility industry with the most advanced broadband wireless system to meet their communication needs for efficient operation and management of the electrical grid.

II. THE AT&T-NOKIA SOLUTION WILL UNLOCK THE POTENTIAL OF THE WCS C AND D BLOCKS FOR SMART GRID AND SMART CITY APPLICATIONS

Access to reliable, safe and affordable energy is critical to the American economy. Utilities are deploying smart grid technology to modernize, secure, monitor, and operate critical infrastructure to ensure uninterrupted operations. A secure, reliable and fast

communication network that interconnects the grid devices and operations centers is the foundation for a modern, secure, and smart electric grid.

The growing integration of renewable generation sources such as solar panels and wind turbines, micro grids and electric vehicles into the distribution grid which delivers electricity to our homes and businesses is fundamentally changing how electrical utilities operate and manage the power grid. As such, this is driving the need for new distribution grid capabilities that provide real-time monitoring and control to maintain grid stability, reliability and efficiency. A communications network that will connect new distribution grid devices and support machine to machine communications will enable functions such as remote sensing, control and automation that are critical to the operations of a modern electrical grid.

The Field Area Network (FAN) communication technologies operating on unlicensed spectrum that exist today in most utility distribution grids are not sufficient to meet the various needs of the utilities. Rather, commercial grade wireless technology solutions operating on licensed spectrum such as proposed by AT&T and Nokia is the most efficient way to connect remote grid devices with a FAN. The mission critical communications from connected devices in the FAN need to be secure, reliable and with low latency, while having broadband network capacity to support the new applications and growing traffic demands of utilities.

Because U.S. utilities lack access to licensed broadband spectrum, Nokia has worked in the past with utilities on deploying solutions that utilize spectrum in unlicensed bands. These will face an increasing risk of interference as industries and government implement their internet of things (IoT) strategies and extend communications to billions more devices often using this same unlicensed spectrum. As interference increases, there is

the potential to interrupt real-time communications that enable the control of grid operations and the availability of quality reliable power on which we depend.

It is against this backdrop that Nokia and AT&T developed the proposal set forth in the Petition, where AT&T will make available to utilities the WCS C and D blocks under a long term lease. The LTE-based solution that Nokia developed for this spectrum is the best option for utilities for a safe, reliable and efficient grid. Using this licensed, dedicated spectrum minimizes the risk of interference as industrial IoT deployments using unlicensed spectrum grow and offers the broadband capability to scale to interconnect all applications while providing a platform for future IoT innovation.

The AT&T-Nokia solution utilizes a well understood standards-based LTE technology with demonstrated scalability in service provider networks globally which has a large vibrant ecosystem. It delivers the required bandwidth and low latency for the required performance of current and new Ethernet/IP based applications for enhanced grid monitoring, control and automation. This enables a utility to set the priorities for specific traffic and provides preemption for lower priority traffic so mission critical traffic realizes the required performance.

As AT&T enumerated in its Petition, Nokia has made substantial progress in preparing our LTE solution to work in the C and D blocks with their stringent power and out-of-band emissions limits. We restate, and emphasize, that list of substantial work accomplished thus far to make clear our commitment to this solution:

- performed an initial evaluation of LTE technology's ability to meet utility networks' likely requirements while remaining within the power and out-of-band emissions limits for the C and D Blocks;
- created a preliminary design of a low-power LTE system in a representative market that meets utility networks' likely requirements;
- developed a business case based on this preliminary design;

- performed a link budget analysis of potential interference to SDARS operations and, in detail, identified the design requirements for mitigating harmful interference;
- changed base station antennas to minimize in-band ground-level power nearby;
- completed filter analysis and design for base stations and customer-premises equipment in order to meet out-of-band emissions requirements; and
- revised, using final antenna and filter parameters, the preliminary design of the system for the utility market.[1]

The AT&T-Nokia utility solution utilizes the existing Nokia LTE core, management and backhaul solution which consist of a broad portfolio of IP/MPLS routers, wave division multiplexers (WDM) and microwave packet radio to connect base stations and LTE core that are all broadly deployed.

Nokia has been extremely pleased with the interest shown by utilities throughout the United States. As AT&T set forth in its Petition,[2] this interest was immediately evident following the solution announcement at DistribuTECH 2016 during the 9 utility meetings held at the event. In response to utility requests for initial information on this new communications option, numerous meetings at utility sites have occurred. This high level of interest continued when fifty-nine utility personnel representing 23 utilities attended an introductory seminar on this solution during UTC Telecom & Technology 2016.

This large utility interest has already led to extensive discussions and the development of numerous propagation studies, cost analyses and use case analysis with Tier 1 utilities in preparation for pilots to test specific grid applications. These pilots will enable a utility to simultaneously validate the performance and reliability of specific operational grid applications use cases and refine the coverage design. Verbal commitments for pilots/deployments have already been secured from multiple utilities, and additional memorandums of understanding are currently being finalized.

[1] Petition at 16-17.

[2] Petition at 17.

While the target customer market focus of the AT&T-Nokia solution is the electric utility market, the solution is by no means limited to electric utility applications. Electric utilities can also make this network available for fixed access applications for water and sewer communications needs. The AT&T and Nokia Private LTE solution enables real-time remote monitoring and control capabilities to help identify water leaks and enhance conservation. Support for all of these applications on a single shared network, while providing priority for critical grid operations traffic, helps minimize network interruptions and improve overall operational efficiencies. Such a solution also will eliminate the need to deploy, operate, and maintain multiple disparate communication networks with limited capabilities as exist today.

This network can also be used for fixed access applications as part of a smart city initiative. Efficient connectivity for CCTV, street lights, smart parking and many additional sensor technology enabled solutions to enhance safety, efficiency and enable economic, social and environmental sustainability can be supported. Further, shared access to a utility's private LTE network can offer local government a key element in the basic infrastructure for their IoT deployment to build a smart city.

Smart grid and smart city technology will help drive economic progress and improve our well-being. More efficient use of energy will lower production costs for U.S. businesses—especially energy-intensive ones—making them more competitive and enabling them to allocate more resources to growth. Reduced energy costs for governments will allow them to improve public services or lower the burden on taxpayers. Advances in transportation will make travel faster and safer, improving the flow of commerce as well as people. Greater connectivity will unleash a new generation of entrepreneurs. Better air quality and new health care technology, relying on smart city sensors and networks, will

make us healthier.[3] By contributing to the smart city project, the AT&T-Nokia smart grid solution will help pave the way to a better future.

III. THE PROPOSED TIMELINES ARE NECESSARY FOR SUCCESSFUL DEPLOYMENT AND SERVE THE PUBLIC INTEREST

Nokia supports the new timeline and performance requirements proposed by AT&T. Specifically, AT&T proposes:

- The September 13, 2019 final performance requirement deadline should be extended until September 13, 2021, and the requirement should be set at 30 links per million persons.
- The March 13, 2017 interim performance requirement should be replaced with semiannual report on AT&T's progress—in particular, the number of links deployed in each REAG as of each June 30 or December 31 (as applicable)—starting on January 31, 2018.[4]

Since these communications will support the critical operation of the grid, we expect that many utilities will require testing of this network for a period that spans each of the seasons before large scale deployments will begin. For utilities conducting pilots beginning in the fourth quarter of 2016, in which they will validate the required performance, Nokia would expect large scale deployments beginning in the the later part of the 2017. For such utilities, a significant portion—possibly as much as half—of the total deployment under the initial contract will probably be completed in 2018.

The AT&T proposed new build-out extensions are necessary to provide utilities with sufficient time to complete each pilot, evaluate performance and tune their design before undertaking a multi-year commercial deployment for support of critical grid

[3] *See generally* Press Release, White House, FACT SHEET: Administration Announces New "Smart Cities" Initiative to Help Communities Tackle Local Challenges and Improve City Services (Sept. 14, 2015), https://www.whitehouse.gov/the-press-office/2015/09/14/fact-sheet-administration-announces-new-smart-cities-initiative-help.

[4] Supplement at 2. Nokia also agrees that, given the similarities of the smart grid solution architecture to classic point-to-point fixed systems, a "link" should be defined as each transmission path between a base station and a field device such as individual household meters or devices that aggregate meter readings without regard to whether it satisfies the minimum payload requirement in the Commission's rules. *Id.* at 4-6.

operations. Nokia asserts that the AT&T proposed interim and final build-out requirements are achievable based on our experience working with utilities evaluating and planning pilot deployments. Because these new deployment deadlines will make valuable use of the WCS C and D blocks, and because the requested new deadlines are necessary to achieve this goal, Nokia urges that grant of the Petition would serve the public interest.

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For the forgoing reasons, Nokia respectfully requests that the Commission grant the Petition (as amended by the Supplement) to permit Nokia and AT&T to unlock the potential of the WCS C and D blocks.

Respectfully submitted,

Nokia

/s/

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